AIM : Write a Program for Simple Linear Regression, and calculate Slope and Y Intercept

In [95]:
```
df= ({
    "s_train" : [1,2,3,4,5],
    "y_train" : [2,5,3,8,7]
})
```

In [31]:
```
df
```

Out[31]:
```
{'s_train': [1, 2, 3, 4, 5], 'y_train': [2, 5, 3, 8, 7]}
```

In [32]:
```
import pandas as pd
```

In [33]:
```
df=pd.DataFrame(df)
```

In [34]:
```
df
```

Out[34]:

	s_train	y_train
0	1	2
1	2	5
2	3	3
3	4	8
4	5	7

In [79]:
```
df["s_mean"] = df["s_train"].mean()
```

In [80]:
```
df
```

Out[80]:

	s_train	y_train	y_mean	s_mean
0	1	2	5.0	3.0
1	2	5	5.0	3.0
2	3	3	5.0	3.0
3	4	8	5.0	3.0
4	5	7	5.0	3.0

In [81]:
```
df["y_mean"] = df["y_train"].mean()
```

In [82]:
```
df
```

Out[82]:

	s_train	y_train	y_mean	s_mean
0	1	2	5.0	3.0
1	2	5	5.0	3.0
2	3	3	5.0	3.0
3	4	8	5.0	3.0
4	5	7	5.0	3.0

In [83]:
```
import numpy as np
```

In [84]:
```
np.cov(df["s_train"],df["y_train"])
```

Out[84]:
```
array([[2.5 , 3.25],
       [3.25, 6.5 ]])
```

In [85]:
```
np.var(df["s_train"])
```

Out[85]:
```
2.0
```

In [86]:
```
3.25/2.5
```

Out[86]:
```
1.3
```

In [87]:
```
b= 5.0 - (1.3*3.0)
```

In [88]:
```
b
```

Out[88]:
```
1.0999999999999996
```

In [89]:
```
class SimpleLR():
    def __init__(self):
        self.m = None
        self.b = None

    def fit(self, x_train, y_train):
        num = 0
        den = 0

        for i in range(x_train.shape[0]):
            num = num + ((x_train[i] - x_train.mean()) * (y_train[i] - y_train.mean()))
            den = den + (x_train[i] - x_train.mean())**2

        self.m = num / den
        self.b = y_train.mean() - (self.m * x_train.mean())

        print(self.m)
        print(self.b)

    def predict(self, x_test):
        return (self.m * x_test) + self.b
```

In [90]:
```
lr = SimpleLR()
```

In [91]:
```
lr.fit(df["s_train"], df["y_train"])
```

```
1.3
1.0999999999999996
```

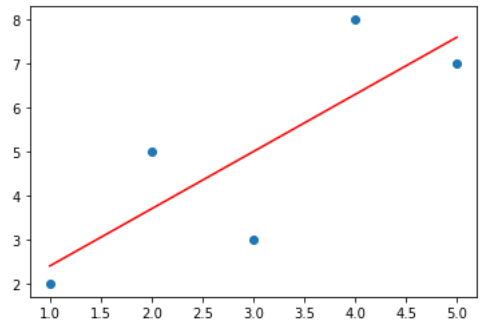
In [92]:
```
lr.predict(6)
```

Out[92]:
```
8.9
```

In [93]:
```
import matplotlib.pyplot as plt
```

In [94]:
```
plt.scatter(df["s_train"],df["y_train"])
plt.plot(df["s_train"],lr.predict(df["s_train"]),color="red")
```

Out[94]:
```
[<matplotlib.lines.Line2D at 0x1f37b0209a0>]
```



In [ ]:

In [ ]: